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Original Article

Pattern and Causes of Tooth Extraction in Patients Reporting to a Teaching Dental Hospital

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Abstract

Objective: The present study was conducted to evaluate the pattern and causes of tooth loss. This will be helpful for dental practitioners to be more vigilant regarding oral health care.

Methodology: A cross sectional study was carried out at Islamabad Dental Hospital, an affiliated teaching dental hospital of Islamabad Medical & Dental College, Bharakahu. Dental extractions carried out over a period of one year and eight months were included in the study.

Results: A total of 8355 patients (12562 extractions in a total) were evaluated with majority 50 years and above and predominance of females. Mandibular posterior teeth were frequently extracted, with mandibular 1st molar in dominance due to caries.

Conclusion: Regardless of age, gender and set of dentition, caries was the key reason of most of the extractions. Mandibular first molar was the most commonly extracted tooth. Gender distribution indicated females in majority.

Keywords: Dental caries, Female, Mandibular posterior teeth, Molar, Permanent dentition.

Introduction

Teeth serve individuals not only for functional reasons but also for esthetics.[1] The importance of permanent teeth can be exemplified by the fact that they are supposed to last for life time. Unsalvageable teeth inevitably result in tooth loss, if voluntary then known as Extraction. Dental extraction is one of the most common and affordable procedure for patients to achieve instant results and relief from pain.

Islamabad Dental hospital in Barakahu, is a training institute for undergraduate as well as postgraduate dental education. A full range of dental treatment procedures are offered to all patients seeking dental care. Developing countries have the limitation of resources which prove a barrier to both patients and doctors. Pakistan being the developing country (Classified by WHO) also faces the same problems. This may result in simple dental care procedures like extractions as more preferred choice.

Tooth loss can be linked to many factors primarily characterized into clinical and non-clinical. Clinical factors include dental caries (unsalvageable), periodontitis, dental trauma, eruption problems (impactions, pericoronitis), prosthodontic reasons and orthodontic reasons. From nonclinical perspective socioeconomic demographic factors, lack of education, oral hygiene practices, lack of awareness and patients demand of tooth extraction even after restorative treatment are available.[2,3]

A number of studies have been conducted worldwide owing to the pattern of tooth extractions, however only a few studies have been conducted locally in Pakistan. Most studies indicated caries as the major cause of tooth extraction. Other reasons reported from various studies included trauma, pericoronitis or impacted teeth, supernumery teeth, prosthodontics reasons, failed endodontic, local pathologies, and poor oral hygiene.[4-6]

Extractions have been reported in all ages. But as age progresses the causes of extractions differs. Caries, orthodontic reason, and to a lesser extent impactions and fractures accounted for majority of the extractions in individuals below the age of 40.[7,8] With progression of age, periodontitis becomes the leading cause.[9] Non-clinical factors, primarily patient demand, constitutes 30% of the causes of dental extractions in a survey conducted in Iran.[10]

The aim of present study was to investigate the patterns and reasons for tooth extraction in patients operated in the department of oral & maxillofacial surgery, Islamabad Dental Hospital. Based on the results of this study we will take steps towards the prevention of tooth loss. This study will be also helpful in planning areas of future research.

Methodology

This cross sectional quantitative study, was conducted in Islamabad Dental Hospital, Barakahu. The data form was

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specifically designed for the Oral and Maxillofacial surgery department including demographic variables as well as categories (primary/secondary dentition), quadrant of maxilla and mandible; tooth extracted and reasons for tooth extractions. The study was conducted over a time period of one year eight months. Sampling technique was non-probability convenient sampling. All the extractions carried out during this period were included in the present study. The patient operated under general anesthesia for extractions and incomplete data forms of extractions were excluded. Data was encoded and entered in SPSS. Descriptive analyses were done and results presented in frequencies and percentages (table and figures). Cross-tabulation of pattern and reasons of dental extractions were done in relation to age, gender, primary and secondary dentition, site and type of tooth extraction.

Results

The present study included 8355 patients in which a total of 12562 teeth were extracted. Male to female ratio was 0.7:1. Mean and standard deviation of age was 37.75±16.84. The most frequently reported age for extraction was 50 years and above. The secondary teeth are more commonly extracted as compared to primary teeth with a total 92% accounting for the permanent dentition and 8% for the primary dentition. In both dentitions mandibular posterior teeth is the dominant group for extractions followed by maxillary posterior teeth (Figure 1). Mandibular left first molar was the most frequently extracted tooth.

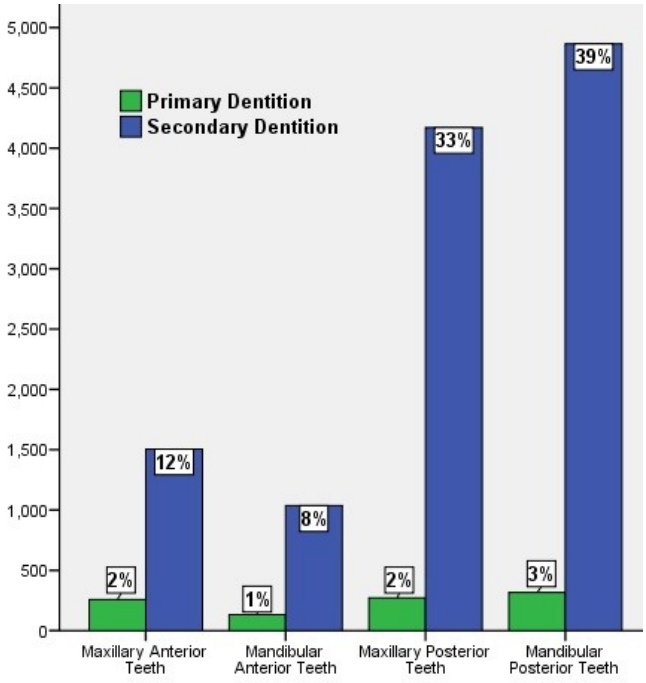

Figure 1: Primary/Secondary Teeth Extractions in different quadrants

Extractions procedures were more in females as compared to males (7420 extractions in females and 5142 in males) but in both genders highest dental extractions were done in mandibular posterior quadrant followed by maxillary posterior quadrant (Table I). When dental extractions were analyzed according to age groups again highest were in mandibular posterior quadrant and least in mandibular anterior (Table 2).

Table 1: Dental Extraction in different quadrants compared with gender

Tooth Extraction Quadrant	Gender		Total
	Male (n)	Female (n)	
Maxillary Anterior Teeth	690	1073	1763
Mandibular Anterior Teeth	446	723	1169
Maxillary Posterior Teeth	1829	2614	4443
Mandibular Posterior Teeth	2172	3008	5180
Total	5137	7418	12555

Table2: Dental Extraction in different quadrants compared with age

Age Groups	Tooth Extraction Quadrants				Total (n)
	Maxillary Anterior Teeth (n)	Mandibular Anterior Teeth (n)	Maxillary Posterior Teeth (n)	Mandibular Posterior Teeth (n)	
1-9 Years	168	95	132	140	535
10-19 Years	113	46	290	461	910
20-29 Years	143	42	717	1101	2003
30-39 Years	260	131	1089	1211	2691
40-49 Years	294	244	920	942	2400
50 Years & Above	785	611	1295	1325	4016
Total	1763	1169	4443	5180	12555

Caries was the most predominant reason for tooth extraction accounting for 85.3% followed by periodontal reasons 7.6% and impactions 0.5% being the least (Figure 2).

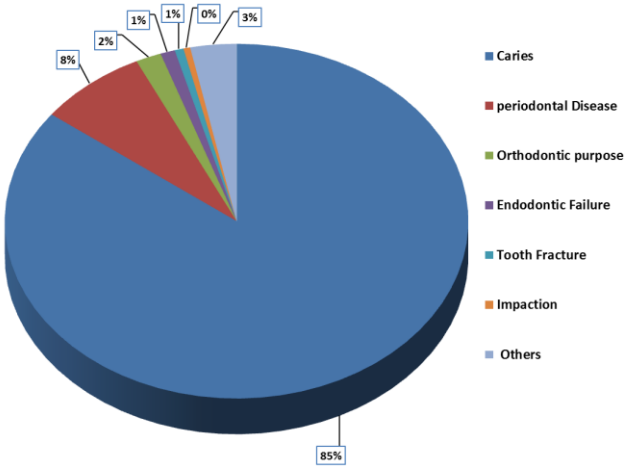

Figure 2: Reasons for dental Extractions

Comparison of dental extractions reasons in gender shows no difference as caries was found to be most common reason in both genders and impactions the least. When reasons were compared according to age, caries was again most common reason in all age groups. Most of dental extractions due to impaction were carried out in age bracket of 20-29 years (table 3). Reasons of teeth extraction were also analyzed according to site of extractions and presented in table 4.

Table 3: Comparison of Dental Extraction Reasons in different age groups

Reasons for Dental Extractions	Age Groups in Years						Total (n)
	1-9 (n)	10-19 (n)	20-29 (n)	30-39 (n)	40-49 (n)	50 & Above (n)	
Caries	399	673	1814	2467	2076	3283	10712
Periodontal Disease	9	8	31	108	260	541	957
Orthodontic purpose	46	120	47	5	0	6	224
Endodontic Failure	3	9	30	40	17	29	128
Tooth Fracture	3	5	22	15	12	21	78
Impaction	0	6	32	16	2	3	59
Others	76	93	29	40	33	133	404
Total	536	914	2005	2691	2400	4016	12562

Table 4: Reasons of Teeth Extractions according to Site

Reasons of Teeth Extraction	Tooth Extraction Quadrants				Total (n)
	Maxillary Anterior (n 1167)	Mandibular Anterior (n)	Maxillary Posterior (n)	Mandibular Posterior (n)	
Caries	898	425	2622	3166	7111
Periodontal Diseases	103	125	162	190	580
Orthodontic purpose	50	26	63	22	161
Endodontic Failure	8	5	38	63	114
Tooth Fracture	22	1	26	17	66
Impactions	1	0	7	40	48
Others	85	56	65	62	268
Total	1167	638	2983	3560	8348

Discussion

Knowing the pattern of dental extractions and reasons are always beneficial to the dental practitioner for better services to community. In the present study, mandibular posterior teeth specifically the first molar are most frequently extracted. First molar is the earliest permanent tooth to erupt in oral cavity so more prone to caries and periodontal diseases. In young age, adequate hygiene cannot be achieved along with unhealthy oral habits.[11] Morphology of the molars (prominent fissures and pits) is another reason for accumulation of plaque, which leads to caries after bacterial invasion. The misconception among the caretakers, assuming first molar to be a deciduous tooth, which eventually shed can also be added reasons. They do not seek treatment even if the tooth is decayed. Pain being the most debilitating factor in patient's opinion for which immediate treatment is demanded leading to an extraction instead of salvaging the tooth. In Pakistan a population of 150 million is catered by only 5000 registered dentist. This makes treatment in the remote areas considerably difficult in terms of traveling and cost hence extractions becomes more popular as compared to dental restoration.[1] Maxillary central incisors were the least extracted teeth in this study.

A great variation exists in the pattern of tooth extraction in different countries. The primary dentition barely makes 10% of the entire sample again with the mandibular posterior teeth being extracted in higher percentage. However, it was noted that the maxillary anterior and posterior teeth were

being extracted at the same rate in deciduous group.

Regarding the permanent dentition, Saudi study revealed mandibular molars as most commonly extracted (60%) tooth but maxillary lateral incisors as least (0.7%).[1] A Study conducted in Scotland reported premolars to be extracted in higher percentage rather than molars which were also proven by a recent study done in Sulaimani and Mosul.[14-16] Study conducted in Nigeria concluded that lower molars were most commonly extracted (79%) while canine were the least (1.2%).[17] Amongst the molars the frequency of extractions are in the following order mandibular first molars, maxillary first molars, mandibular second molar followed by maxillary second molars. Right side extractions were more frequently involved. Amongst the anterior teeth maxillary teeth are more abundantly extracted. A drastically high percentage of anterior teeth are extracted in the age group of 50 and above.

Caries was found to be the highest reason for dental extractions. It was considered the most common cause for tooth loss regardless of the developing or developed countries. Other studies reported similar results with caries being responsible for majority of the extractions in a wide range from 32.6% to 86.2%.[4,8,9,17,18] Caries as a reason for extraction was also more in females which was in accordance with the other studies conducted in south Africa, Nigeria, Saudiarabia, Benin city, Nigerain rural, Nepal, Sulaimani but contrary results were reported from Rawalpindi, Peshawar, Karachi and Turkey.[7,8,11,13,15,17-23] In our society females are more homebound, dependent on males for traveling and neglect their dental health. This leads them for preferring treatments which are easier, affordable, time restrained and with minimal number of dental appointments. Such patients instead of a root canal treatment even if advised they preferred dental extraction.

Periodontal reasons were predominantly involved in extractions above 45 years of age. Poor oral hygiene including plaque deposition, calculus deposits (supra and sub gingival) combined with age would lead to a rapid regression of the gingiva particularly in the molars. This is accompanied by bone loss which is cumulative, irreversible and chronic in nature and result in loss of tooth. Other studies had various results with periodontal causes being the primary, secondary and least involvement.[12,14,19,20,22,24,25]

Impactions and orthodontic reasons were the rare conditions in which extractions were performed. Similar results were also reported by other studies conducted worldwide.[13,18,19] Orthodontic treatment was only sought by the upper middle class or upper class individuals of the society due to financial constraints. On the other hand a survey in Riyadh city reported dental caries followed by orthodontic reasons as the primary cause.[13]

The higher contribution of caries and periodontal reasons for dental extractions in present study suggest the need of better working for prevention of these diseases and so the teeth loss. It is also recommended that community awareness should be increased for vigorous oral hygiene maintenance and early dental visits. Government should bring an oral health policy in which dental institutions and organizations are made responsible for community awareness campaigns. A health system should be developed for effective dental care, prevention and treatment of dental diseases on national level especially for females. Authors also recommend that hospitals should be equipped accordingly.

Conclusion

1. The most commonly extracted tooth was mandibular first molar. More number of teeth were extracted from posterior quadrants of both jaws.
2. Dental caries and periodontal diseases were the predominant reasons of dental extraction regardless of the age and gender. Dental extractions due to periodontal reasons significantly increase with age.
3. Male were less frequent visitors than the females for extractions. Higher percentage was reported in middle age group.

Recommendations

Keeping in view the results, every dental practitioner needs to bear in mind the potential sources of tooth loss and their consequences. In accordance with the present study majority of the extractions are caused by caries especially the molars hence giving the practitioner a clear view of the teeth to be more vigilant about. Also guidance of the patients and general public regarding this should be sought by the dentists.

Conflict of Interest

This study has no conflict of interest as declared by any author.

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Authorship Contribution:

Author 1,2,3: Conception, Synthesis and Planning of the research

Author 4: Interpretation, analysis and discussion